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Larynx-Preserving Resection of the Cervical Esophagus for Cervical Esophageal Carcinoma Limited to the Submucosal Layer

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This report describes the surgical procedure consisting of larynx-preserving resection of the cervical esophagus and satisfactory lymphadenectomy. The sternum was split at the level of the 3rd intercostal space, which allowed an upper-mediastinal lymphadenectomy to be performed easily. The cervical esophagus was reconstructed using a free jejunal autograft. The stump of the thoracic esophagus and the caudad stump of the jejunal graft were anastomosed using a circular stapling instrument. The posterior part of the cephalad esophagojejunostomy was completed in two layers using the Lembert stitch. The wall of the cervical esophagus was opened to determine the oral cut line considering the safety margin from the carcinoma. After cervical esophagectomy was completed, suturing of the anterior wall was performed in one layer. The left cervical transverse artery and the internal jugular vein were employed for recipient vessels. This procedure is acceptable for high cervical esophageal carcinoma limited to the submucosal layer.

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KEY WORDS: esophageal carcinoma; cervical esophagectomy; free jejunal autograft; esophageal reconstruction; median sternotomy; upper-mediastinal lymph node dissection

INTRODUCTION

Treatment of cervical esophageal carcinoma remains a surgical challenge, due to the difficulty in satisfactorily restoring the alimentary continuity after resection of the cervical esophagus [1]. The use of endoscopic mucosal resection (EMR) for esophageal carcinoma is limited to the submucosal layer [2]. However, it is almost impossible to perform EMR successfully for a tumor located close to the esophageal orifice. This brief clinical report describes the surgical procedure for high cervical esophageal carcinoma, with the depth of invasion within the submucosal layer being assessed preoperatively. The surgery consisted of larynx-preserving resection of the cervical esophagus and satisfactory lymphadenectomy.

CASE REPORT

A 57-year-old man with no family history of esophageal carcinoma noted pain on swallowing and slight dysphagia. Gastrointestinal barium studies showed a small protruding lesion in the cervical esophagus near the esophageal orifice (Fig. 1). Histological examination of the specimen obtained with esophagoendoscopy revealed that the small tumor was a well-differentiated squamous cell carcinoma. Endoscopic ultrasonography of the cervical esophagus demonstrated that the tumor invasion was confined to the submucosal layer. No abnormal lymph node swelling was detected in the cervical lesion by X-ray computed tomography. Surgery was performed under the diagnosis of cervical esophageal carcinoma limited to the submucosal layer without marked lymph node involvement.

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Fig. 1. Preoperative gastrointestinal barium studies show a small protruding lesion in the cervical esophagus near the esophageal orifice (arrow).

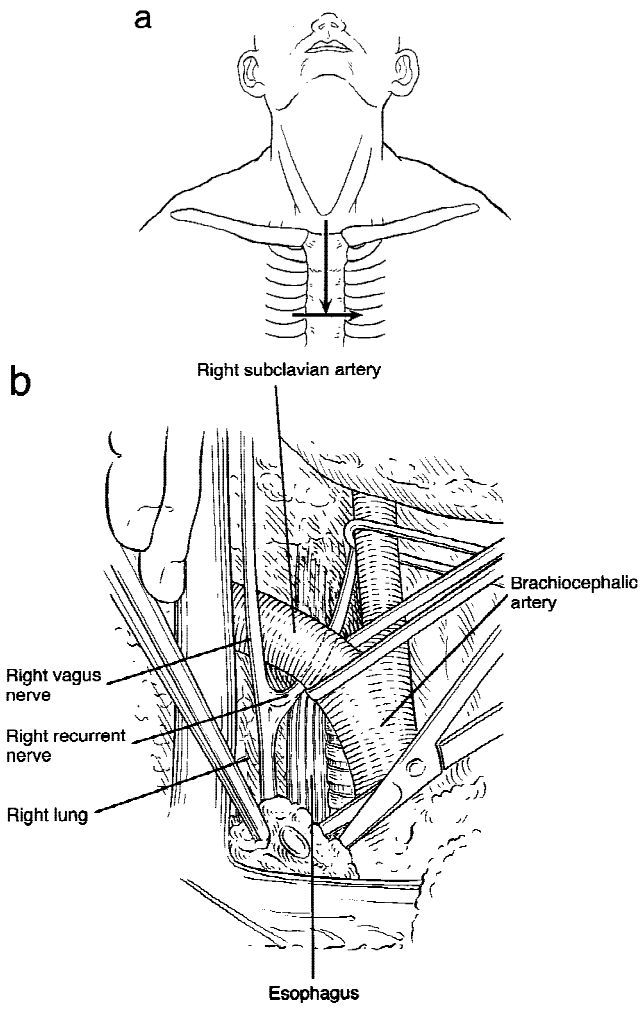

Fig. 2. **(a)** An upper median sternotomy is made at the level of the 3rd intercostal space. Then, the sternum is split transversely at the level of the 3rd intercostal space. **(b)** The upper-mediastinal lymph nodes including recurrent nodes are easily dissected.

An upper medial thoracic incision was added to the collar incision. The sternum was split at the level of the 3rd intercostal space, which allowed an upper-mediastinal lymphadenectomy to be performed easily, especially dissection of the thoracic recurrent nerve nodes (Fig. 2). After dissection of the bilateral cervical and upper-mediastinal lymph nodes, the cervical esophagus was separated from the trachea (Fig. 3). During the cervical procedure, a second surgical team performed the laparotomy. Then, a suitable segment of the jejunum for a free jejunal graft was identified. A 10-cm-long free jejunal graft was harvested from the upper portion of the jejunum with blood supply from the 3rd jejunal artery. During this procedure, the cervical surgical team prepared the recipient vessels, and the free jejunal graft was transferred to the cervix. The caudad border of the thoracic esophagus was cut, and the stump of the thoracic esophagus and the caudad stump of the jejunal graft were anastomosed using a circular stapling instrument (Fig. 4). The cephalad enteric anastomosis was started before the cephalad border of the cervical esophagus was cut. The wall of the cervical esophagus was opened to visualize the esophageal tumor, and the cephalad cut line was determined considering the safety margin from the carcinoma (Fig. 5). During the suturing of the posterior area, the cervical esophagus could be shifted to make high-level enteric anastomosis feasible. The pharyngocricoid muscle should be cut if it is difficult to set the enteric cut line far enough from the carcinoma. The posterior area of the cephalad esophagojejunostomy was completed in two layers using the Lembert stitch, with 3-0 silk for the outer layer and 3-0 polyglactin sutures for the inner layer. Af-

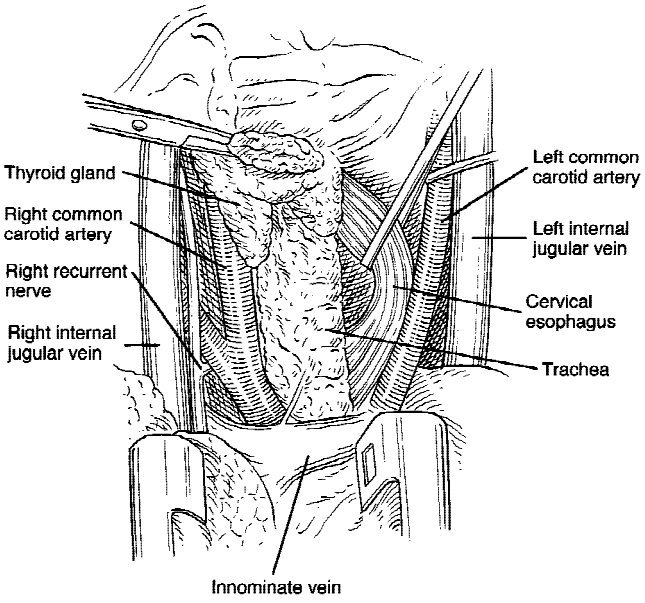

Fig. 3. The cervical esophagus is separated from the trachea and drawn to the left side.

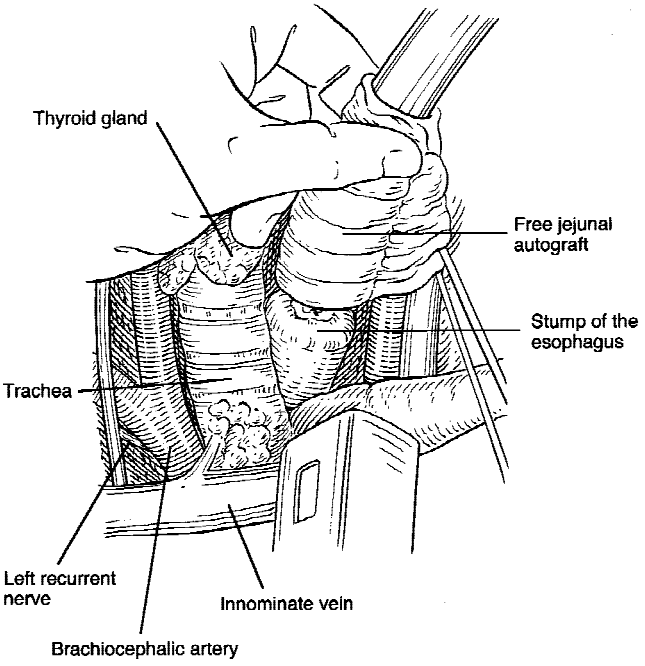

Fig. 4. The stump of the thoracic esophagus and the caudad stump of the jejunal graft are anastomosed using a circular stapling instrument.

ter cervical esophagectomy was completed, suturing of the anterior wall was performed in one layer with 3-0 polyglactin sutures. In this case, the left cervical transverse artery and the internal jugular vein were employed for recipient vessels. The jejunal artery and the left cervical transverse artery were anastomosed in an end-to-end manner using 7-0 polypropylene sutures. The end-to-side anastomosis was made between the jejunal vein and the internal jugular vein (Fig. 6).

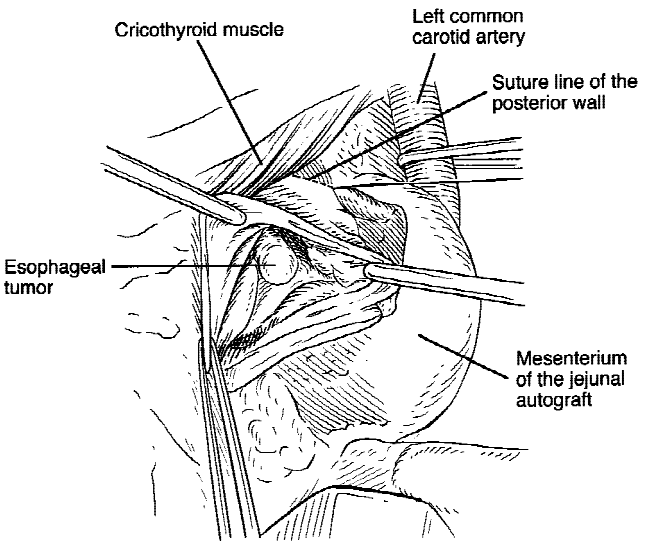

Fig. 5. The cephalad cut line of the esophagus is determined considering the safety margin from the carcinoma after opening the esophageal wall.

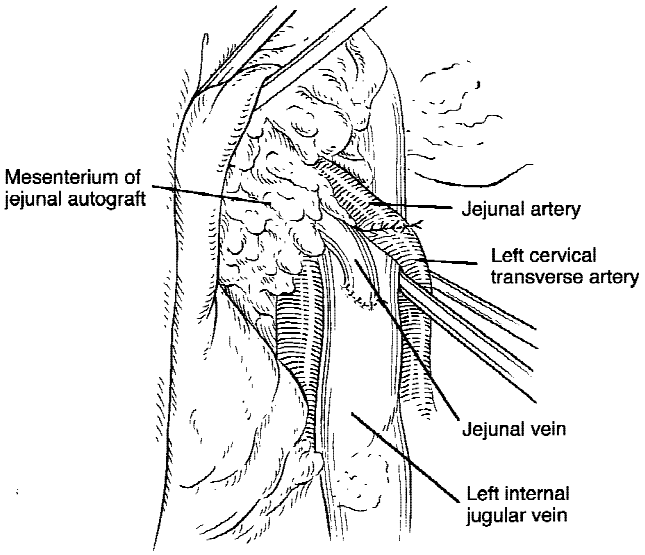

Fig. 6. The jejunal artery and the left cervical transverse artery are anastomosed in an end-to-end manner. An end-to-side anastomosis is made between the jejunal vein and the internal jugular vein.

The postoperative course was uneventful. No palsy of the recurrent nerve was observed. Postoperative gastrointestinal studies revealed no anastomotic leakage (Fig. 7). Histopathological examination of the resected specimen confirmed that the tumor invasion had been confined to the submucosal layer, and there was no lymph node involvement. The patient's life returned to normal. No recurrent disease, including that at the cephalad enteric anastomotic site, was detected 1 year after surgery.

DISCUSSION

Combined resection of the larynx is necessary for curative resection of advanced hypopharyngeal carcinoma

Fig. 7. Postoperative gastrointestinal studies show no anastomotic leakage.

or high cervical esophageal carcinoma which invades the esophageal orifice [3]. Indeed, absence of the larynx greatly facilitates reconstruction of the cervical esophagus with a free jejunal autograft [4]. However, loss of voice results in severe inconvenience for a patient.

EMR is a minimally invasive strategy for esophageal carcinomas limited to the superficial area of the submucosal layer. The best candidates with esophageal carcinomas for EMR are patients with tumors limited to the intraepithelium, and with no vascular invasion and lymphatic vessel invasion [2]. It is difficult to perform EMR for tumors located near the esophageal orifice, as it is impossible to maintain adequate intraluminal space by inflation. Under such conditions, it is also difficult to reconstruct the resected specimen and to confirm a sufficient surgical margin.

Esophageal carcinoma limited to the submucosal layer (sm carcinoma) is also a candidate for resection of the whole layer. As the prognosis of esophageal sm carcinoma is much poorer than that of gastric sm carcinoma, radical surgery consisting of resection of the esophagus and lymphadenectomy is recommended for esophageal carcinoma with massive submucosal invasion and/or vascular invasion or lymphatic vessel invasion [5]. However, an accurate diagnosis for the depth of invasion and the existence of vascular invasion or lymphatic vessel invasion are almost always made after resection of the lesion. If combined resection of the larynx was performed in all patients with esophageal carcinoma located near the esophageal orifice and diagnosed as sm carcinoma preoperatively, a considerable number of people would suffer from excess surgery. In our surgical procedure, the cephalad cut line of the esophagus was set squarely at the lesion. Furthermore, an accurate diagnosis of the depth of invasion was obtained histopathologically, without voice loss. Complete pharyngolaryngectomy for patients at high risk for recurrence, especially local recurrence, should be performed after informed consent.

Lymph node involvement is one of the main factors which reduces the survival of esophageal carcinomas. In our procedure, satisfactory lymphadenectomy was performed, including the cervical lymph node and upper-mediastinal lymph node.

CONCLUSIONS

Larynx-preserving transfer of a free jejunal autograft has been considered an option for repair of benign traumatic cervical esophageal stenosis [4]. This procedure is also acceptable as treatment for high cervical esophageal carcinoma limited to the submucosal layer, even though it may be associated with a slight increase in the local recurrence rate.

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